**Claims**

1. A packaging material used for wrapping foodstuffs and for inhibiting the growth of micro-organisms in foodstuffs, said packaging material having a metal-ion sequestering agent capable of removing designated metals ions from the surfaces of said foodstuffs and from liquid extrudates of foodstuffs.

2. A packaging material according to claim 1 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{10}$ with iron (III).

3. A packaging material according to claim 1 wherein said packaging material is made of glass, metal, plastic or paper.

4. A packaging material according to claim 1 wherein said packaging material comprises a plurality of layers having an outer layer having sequestering agent.

5. A packaging material according to claim 1 wherein said packaging material comprises a plurality of layers comprising an outer barrier layer for contact with said foodstuff and an inner layer having said sequestering agent, said inner layer having a first side adjacent said barrier layer, said barrier layer allowing liquid to pass through to said inner layer.

6. A packaging material according to claim 5 wherein a second outer layer is provided on a second side of said inner layer.

7. A packaging material according to claim 6 wherein said second outer layer is a second barrier layer that also allows liquid to pass through to said inner layer.

8. An article according to claim 1 wherein said sequestering agent is immobilized on the support structure and has a high–affinity for biologically important metal-ions such as Mn, Zn, Cu and Fe.

9. A packaging material according to claim 1 wherein said sequestering agent is immobilized on the support structure and has a high–selectivity for biologically important metal-ions such as Mn, Zn, Cu and Fe.

10. A packaging material according to claim 9 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{20}$ with iron (III).

11. A packaging material according to claim 9 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{30}$ with iron (III).

12. A packaging material according to claim 1 wherein said sequestering agent comprises derivatized nanoparticles comprising inorganic nanoparticles having an attached metal-ion sequestrant, wherein said inorganic nanoparticles have an average particle size of less than 200 nm and the derivatized nanoparticles have a stability constant greater than $10^{10}$ with iron (III).

13 A packaging material according to claim 9 wherein said sequestering agent comprises derivatized nanoparticles comprising inorganic nanoparticles having an attached metal-ion sequestrant, wherein said inorganic nanoparticles have an average particle size of less than 200 nm and the derivatized nanoparticles have a stability constant greater than $10^{20}$ with iron (III).

14. A packaging material according to claim 1 wherein said support structure further comprises a polymeric layer containing said metal-ion sequestering agent.

15. A packaging material according to claim 14 wherein the polymer is permeable to water.

16. A packaging material according to claim 14 wherein the polymer has a water permeability of greater than 1000 [($cm^3$cm)/($cm^2$sec/Pa)] x $10^{13}$.

17. A packaging material according to claim 14 wherein the polymer has a water permeability of greater than 5000 [($cm^3$cm)/($cm^2$sec/Pa)] x $10^{13}$.

18. A packaging material according to claim 14 wherein the polymer comprises one or more of polyvinyl alcohol, cellophane, water-based polyurethanes, polyester, nylon, high nitrile resins, polyethylene-polyvinyl alcohol copolymer, polystyrene, ethyl cellulose, cellulose acetate, cellulose nitrate, aqueous latexes, polyacrylic acid, polystyrene sulfonate , polyamide, polymethacrylate, polyethylene terephthalate, polystyrene, polyethylene and polypropylene or polyacrylonitrile.

19. A packaging material according to claim 14 wherein the metal-ion sequestering agent comprises are 0.1 to 50.0 % by weight of the polymer.

20. A packaging material according to claim 12 wherein said inorganic nanoparticles have an average particle size of less than 100 nm.

21. A packaging material according to claim 12 wherein said inorganic nanoparticles have an average particle size of less than 50 nm.

22. A packaging material according to claim 12 wherein said inorganic nanoparticles comprise silica oxides, alumina oxides, boehmites,

titanium oxides, zinc oxides, tin oxides, zirconium oxides, yttrium oxides, hafnium oxides, clays, and alumina silicates.

23. A packaging material according to claim 14 wherein said metal-ion sequestrant comprises an alpha amino carboxylate, a hydroxamate, or a catechol functional group.

24. A packaging material according to claim 12 wherein the metal-ion sequestrant is attached to the nanoparticle, by reacting the nanoparticle with a metal alkoxide intermediate of the sequestrant having the general formula:

$M(OR)_{4-x}\ R'_x$;

wherein M is silicon, titanium, aluminum, tin, or germanium;
x is an integer from 1 to 3;
R is an organic group; and
R' is an organic group containing an alpha amino carboxylate, a hydroxamate, or a catechol.

25. A packaging material according to claim 12 wherein said metal-ion sequestrant is attached to the nanoparticle by reacting the nanoparticle with a silicon alkoxide intermediate of the sequestrant having the general formula:

$Si(OR)_{4-x}\ R'_x$;

wherein x is an integer from 1 to 3;
R is an alkyl group; and
R' is an organic group containing an alpha amino carboxylate, a hydroxamate, or a catechol.

26. A packaging material according to claim 12 wherein said inorganic nanoparticles have a specific surface area of greater than 100 $m^2/g$.

27. A packaging material according to claim 14 further comprising a barrier layer wherein the polymeric layer is between the surface of the article and the barrier layer and wherein the barrier layer does not contain the derivatized nanoparticles.

28. A packaging material according to claim 27 wherein the barrier layer is permeable to water.

29. A packaging material according to claim 27 wherein the barrier layer has a water permeability of greater than 1000 $[(cm^3cm)/(cm^2sec/Pa)] \times 10^{13}$.

30. A packaging material according to claim 27 wherein the barrier layer has a thickness in the range of 0.1 microns to 10.0 microns.

31. A packaging material according to claim 27 wherein the barrier layer comprises one or more of polyvinyl alcohol, cellophane, water-based polyurethanes, polyester, nylon, high nitrile resins, polyethylene-polyvinyl alcohol copolymer, polystyrene, ethyl cellulose, cellulose acetate, cellulose nitrate, aqueous latexes, polyacrylic acid, polystyrene sulfonate , polyamide, polymethacrylate, polyethylene terephthalate, polystyrene, polyethylene and polypropylene or polyacrylonitrile.

32. A packaging material according to claim 27 wherein microbes cannot pass or diffuse through the barrier layer.

33. A packaging material according to claim 1 wherein said sequestering agent is integrally formed as a part of said material.

34. A packaging material according to claim 33 wherein said packaging material is formed as rigid or semi-rigid structure for holding of said foodstuff.

35. A packaging material according to claim 34 wherein said rigid or semi-rigid structure is substantially in the shape of tray having a substantially continuous outer raised periphery.

36. A packaging material according to claim 1 wherein said packaging material is in the form of flexible sheet that can be wrapped about said foodstuff.

37. A packaging assembly for inhibiting the growth of micro-organisms in foodstuffs, said packaging assembly comprising a tray and absorbent material supported by said tray, said absorbent material having a metal-ion sequestering agent capable of removing designated metals ions for inhibiting the growth of micro-organisms from the surfaces of said foodstuffs and from liquid extrudates of foodstuffs placed on said absorbent material.

38. A packaging assembly according to claim 37 wherein said absorbent material comprises a first inner absorbent layer placed within an outer layer, said outer layer allowing liquid to pass to said inner absorbent layer.

39. A packaging assembly according to claim 38 wherein said outer layer comprises a first ply layer and a second ply layer that are secured about their periphery so as to form a pocket in which said inner layer is provided.

40. A packaging assembly according to claim 37 further comprising a thin film provided for sealing said foodstuffs on said tray.

41. A packaging assembly for inhibiting the growth of micro-organisms in foodstuffs, said packaging assembly comprising a tray having a

metal-ion sequestering agent capable of removing designated metal ions for inhibiting the growth of micro-organisms from the surfaces of said foodstuffs and from liquid extrudates of foodstuffs placed on said tray; and

a thin film provided for sealing said foodstuffs on said tray.

42. A packaging assembly according to claim 41 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{10}$ with iron (III).

43. A packaging assembly according to claim 41 wherein said sequestering agent comprises derivatized nanoparticles comprising inorganic nanoparticles having an attached metal-ion sequestrant, wherein said inorganic nanoparticles have an average particle size of less than 200 nm and the derivatized nanoparticles have a stability constant greater than $10^{10}$ with iron (III).

44. A packaging assembly according to claim 41 wherein said thin film comprises a sequestering agent such that when in contact with said foodstuff said sequestering agents inhibits the growth of microbes from the surfaces of said foodstuffs and from liquid extrudates of foodstuffs.

45. A packaging assembly according to claim 44 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{10}$ with iron (III).

46. A packaging assembly according to claim 44 wherein said sequestering agent comprises derivatized nanoparticles comprising inorganic nanoparticles having an attached metal-ion sequestrant, wherein said inorganic nanoparticles have an average particle size of less than 200 nm and the derivatized nanoparticles have a stability constant greater than $10^{10}$ with iron (III).

47. A packaging assembly for inhibiting the growth of micro-organisms in foodstuffs, said packaging assembly comprising a tray and absorbent

material supported by said tray, said absorbent material having a sequestering agent such that when said absorbent material is placed in contact with said foodstuff said sequestering agent inhibits the growth of microbes from the surfaces of said foodstuffs and from liquid extrudates of foodstuffs placed on said absorbent material.

48 A packaging assembly according to claim 47 wherein said absorbent material comprises a first inner absorbent layer placed within an outer layer, said outer layer allowing liquid to pass to said inner absorbent layer.

49. A packaging assembly according to claim 48 wherein said outer layer comprises a first ply layer and a second ply layer that are secured about their periphery so as to form a pocket in which said inner layer is provided.

50. A packaging assembly according to claim 47 further comprising a thin film provided for sealing said foodstuffs on said tray.

51. A packaging assembly according to claim 47 wherein said sequestering agent is immobilized on the support structure and has a stability constant greater than $10^{10}$ with iron (III).

52. A packaging assembly according to claim 47 wherein said sequestering agent comprises derivatized nanoparticles comprising inorganic nanoparticles having an attached metal-ion sequestrant, wherein said inorganic nanoparticles have an average particle size of less than 200 nm and the derivatized nanoparticles have a stability constant greater than $10^{10}$ with iron (III).